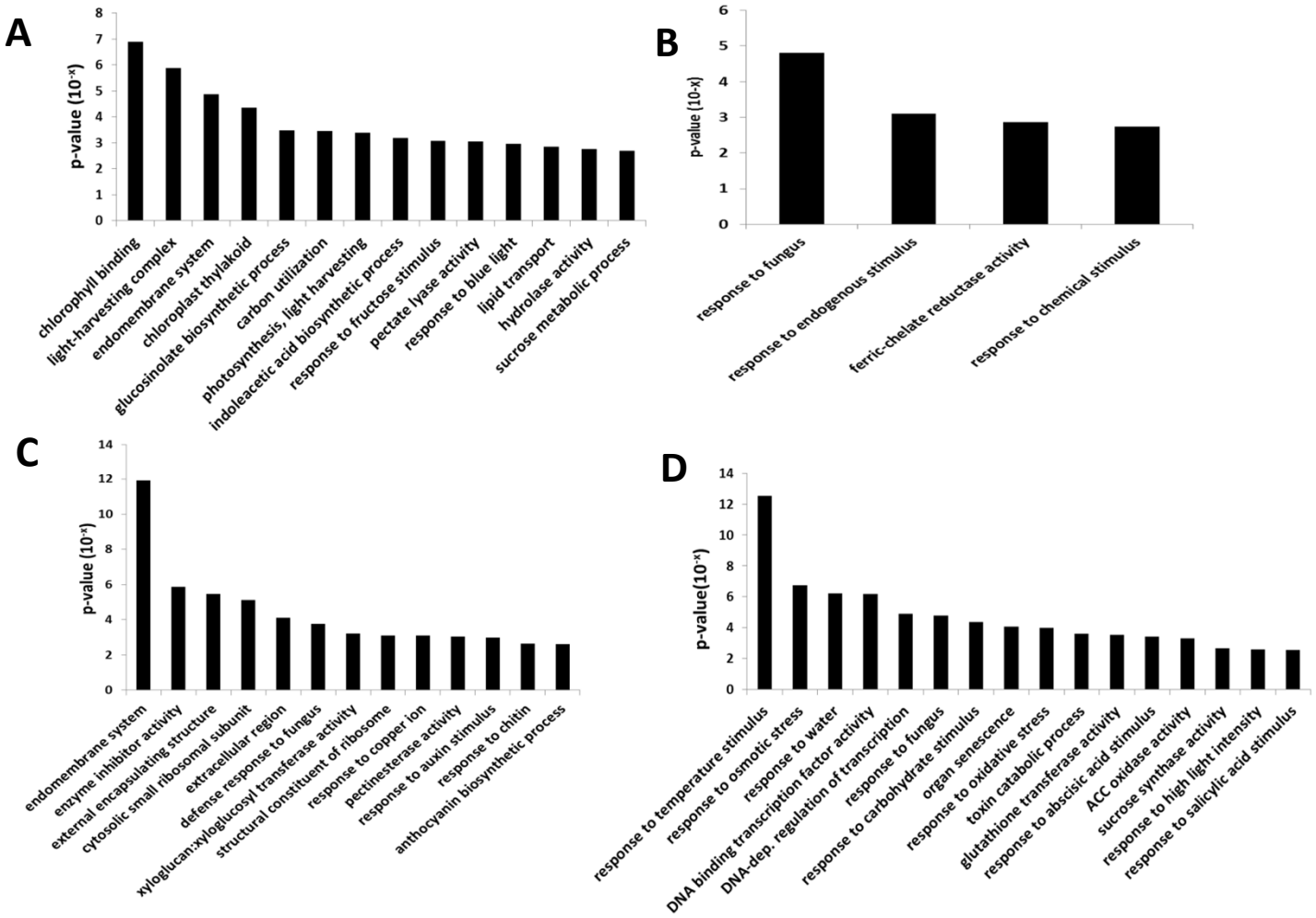
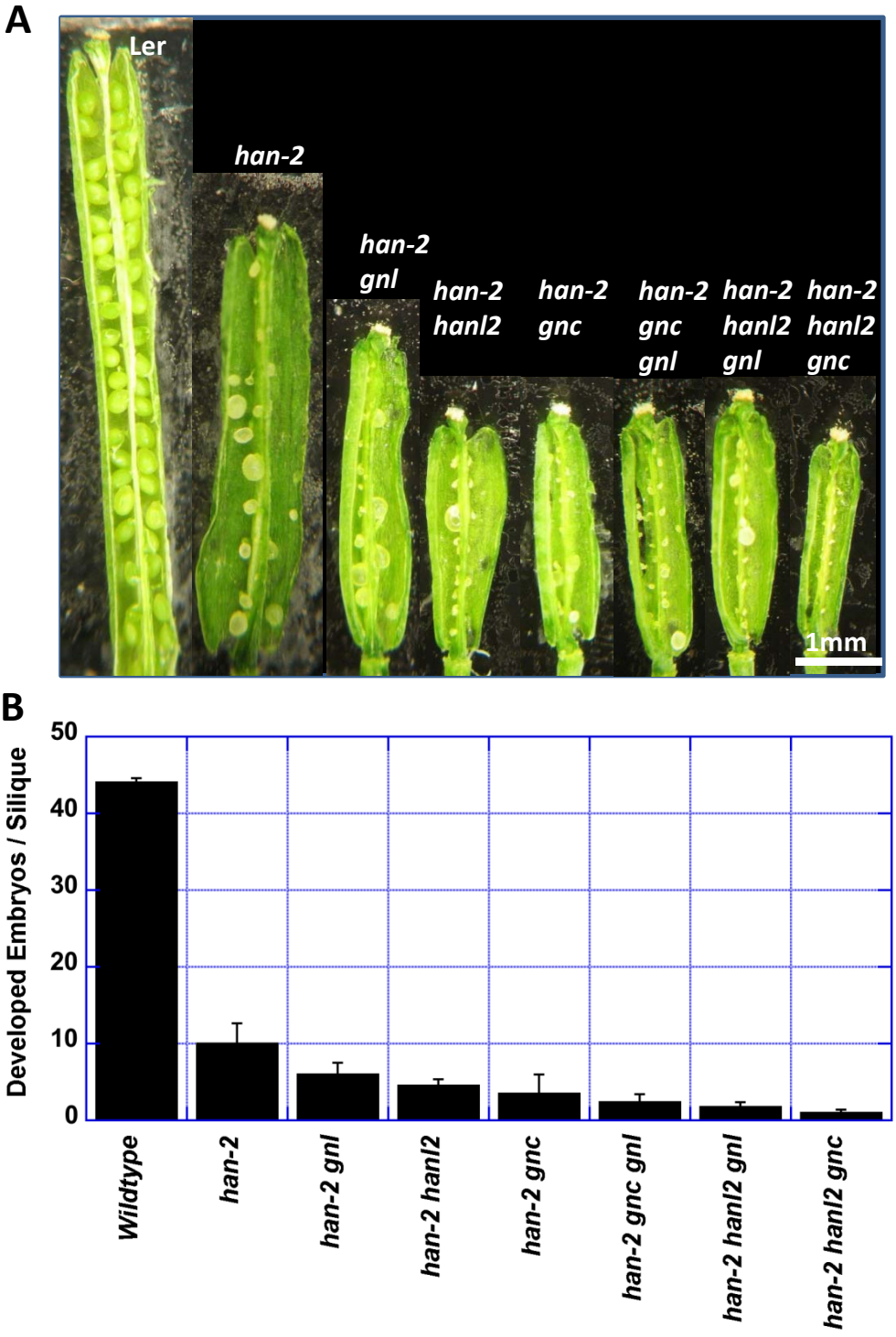
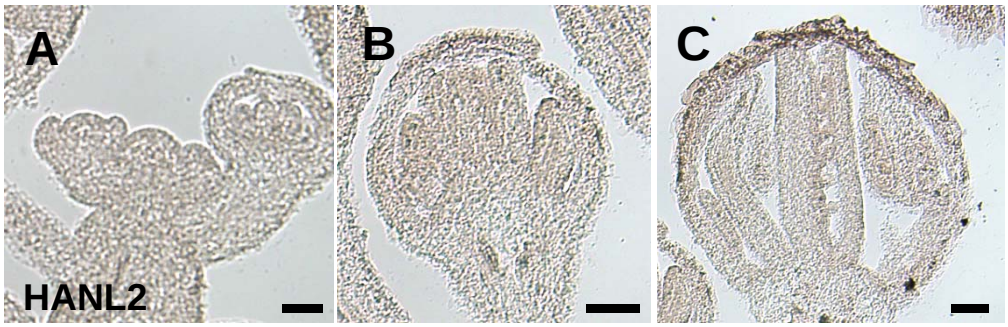


Supplemental Figure 1 . **Gene ontology (GO) term enrichment (P<0.003) in cluster 1 (A), cluster 2 (B), cluster 3(C) and cluster 4 (D) of differentially expressed genes**. GO terms are sorted based on p value.

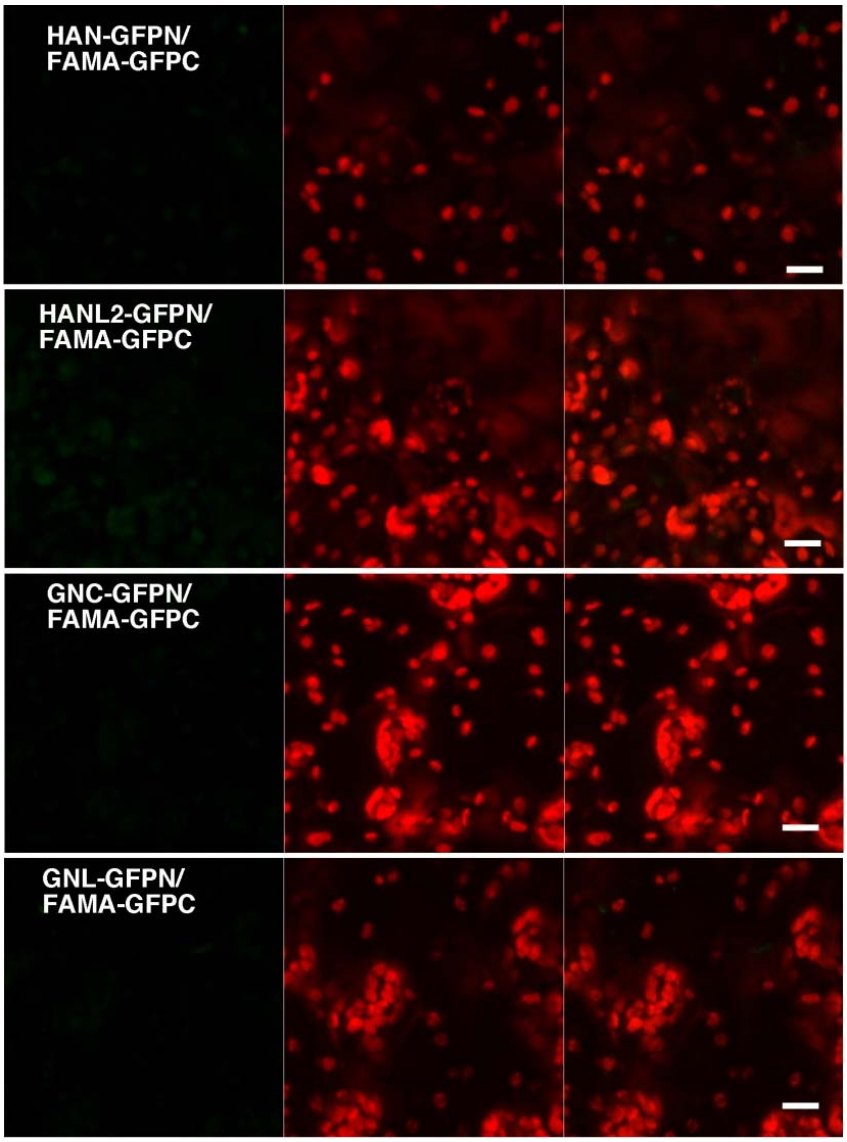


Supplemental Figure 2 . Seed yield is greatly reduced in the combinatory mutants of *HAN* and GATA3 family genes.

(A) Opened siliques at similar developmental stages. (B) Average developed embryos per silique (n=10 siliques). Error bars represent standard deviation.



Supplemental Figure 3. *in situ* hybridization of *HANL2* in *hanl2* mutant flowers. A longitudinal section of the shoot apex (A), a stage 6 flower (B), and a stage 8 flower (C) reveals that *HANL2* signal is almost undetectable in the *hanl2* mutant allele SALK_138626. Bar = 50 µm.



Supplemental Figure 4. Negative controls for interactions between HAN and GATA3 family proteins in BiFC experiments in transiently transformed *Nicotiana benthamiana* leaves. For each picture, a positive interaction is indicated by GFP fluorescence (green) in nuclei (left panel), the tobacco cells are seen via chlorophyll auto-florescence (red) (middle panel), and the merged channels are also shown (right panel). The label HAN-GFPN stands for the HAN fused with N-terminus half of GFP in frame, and similarly for the other constructs. Representative images of HAN-GFPN with FAMA-GFPC, HANL2-GFPN with FAMA-GFPC, GNC-GFPN with FAMA-GFPC and GNL-GFPN with FAMA-GFPC are shown, respectively. The pictures were taken under the same settings and each interaction was confirmed three times with independent infiltrations. Scale bar = 20µm.

Supplemental Table 1. Gene expression patterns of five non-GATA HAN targets in mutant plants and in the transient overexpression of HAN plants

Gene ID	Gene Name	DEX-4h			DEX-72h			DEX-9 days	*han-1*	*han-2*	*han-2 hanl2gnc*
		P-Value	Microarray	qPCR	P-Value	Microarray	qPCR	qPCR	qPCR	qPCR	qPCR
At4g27260	GH3.5	1.37E-08	3.60	2.14± 0.47	3.52E-01	1.70	7.20 ±0.12	2.82±0.20	-8.78± 0.80	-2.36±0.07	-1.18 ±0.02
At3g04730	IAA16	0.00E+00	-5.30	-2.34±0.16	3.88E-04	-2.00	-2.11 ±0.11	-1.21±0.11	-1.77±0.19	1.57±0.11	1.30±0.16
At3g16360	AHP4	1.53E-12	-5.00	-14.63±5.95	4.27E-02	-3.90	-175.1±39.9	-20.57±3.97	-0.60±0.05	-1.21±0.06	1.28 ±0.18
At4g23600	CORI3	1.78E-14	-2.70	-4.04±0.48	5.18E-34	-20.50	-93.64±35.4	-3.61± 0.82	-3.65±0.04	-1.53± 0.02	2.97±0.08
At3g15030	TCP4	7.92E-05	-1.80	-4.09±1.12	1.97E-07	-2.20	-5.90±1.07	-1.14± 0.26	-6.03±0.25	-2.63±0.11	-2.79±0.08

Supplemental Table 2. Primer information used in this study

Primers for qRT-PCR	
HAN-F	5'- TCTCCGCTAACAAGCCAAGT-3'
HAN-R	5'- GAGCCCACGGAGTACCATTA -3'
HANL2-F	5'- CAACTTTGGATCATCAAGCAAG-3'
HANL2-R	5'- ACATCGTAAAATCGTGGACAA-3'
GNC-F	5'- GGTTGATGTCCCCAAAGATG -3'
GNC-R	5'- CACTTCGCCAAAGAGGAGTC -3'
GNL-F	5'- CCGCAGTCTCTGGCGTATC-3'
GNL-R	5'- GTGTTTACCTTTAGGGGCAAA -3'
actin2-F	5'- CCTTCGTCTTGATCTTGCGG-3'-3'
actin2-R	5'- AGCGATGGCTGGAACAGAAC -3'
KNAT4-F	5'- ACTGAGGAAGATAAGGCGAGGT-3'
KNAT4-R	5'- CGGTAGAAGAAGATGGATTGCT-3'
RBE-F	5'- AAGAAAGCCTAACGGAACCAA-3'
RBE-R	5'- CCAATGACCAACCCTAACATC-3'
TCP4-F	5'- ATCCGTTAGGGTTTGACACATC-3'
TCP4-R	5'- AGGAGTAGGAGGAGCGAACAG-3'
MEE3-F	5'- GTGCCATTCCCTGACTACAAG-3'
MEE3-R	5'- TGCTTCTCATCCTCTTTTCCTC-3'
ATH1-F	5'- TCCAAAACTTCCTTCACCCTTA-3'
ATH1-R	5'- TGTTCATTTCCGCATACATCTC-3'
EDA31-F	5'- ATTTCAACTCCTCCTCCGATTT-3'
EDA31-R	5'- TCTCCATTCCTCTTCTCTCAGC-3'
AFO-F	5'- GTAACTGTCCGATGTGGTTGC-3'
AFO-R	5'- CCTGGGGATTGAAGTAAGAGTG-3'
KNAT2-F	5'- TCGGAGAAAGCGACGTTGAT-3'
KNAT2-R	5'- TCGAATACGCGGAAGCAACTC-3'
FUS3-F	5'- GAAAATGTGGAAACCAAGGC-3'
FUS3-R	5'- AAGAGGCACAGACGCCGATAA-3'
CYCD1:1-F	5'- ACCTTTCTCGGGTTCTTTATCTC-3'
CYCD1:1-R	5'- ACTCGTTCGCTACACAGAGAATC -3'
JAZ7-F	5'- GCGAGTAGAGATGTGGAAGAGAA-3'
JAZ7-R	5'- CGGTGGTAAGGGGAAGTTGCT-3'
SEP3-F	5'- AGGGAGAGTAGAATTGAAGAGG-3'
SEP3-R	5'- ATTTGAGAAGATGATGAGAGCA-3'
ATEXPA1-F	5'- AGAGAGAGGGGCATGATAGTAATTT-3'
ATEXPA1-R	5'- TCAAGCACTCGAAGCACCACTT-3'
ARR3-F	5'- ACTCTACGGTGGAATCGCCTCT-3'
ARR3-R	5'- AAGCTAATCCGGGACTCCTCAT-3'
ARR5-F	5'- TTTTGCGTCCCGAGATGTTAG-3'
ARR5-R	5'- TACTATCATCAACAGCAAGAACATGA-3'
ARR5-F	5'- TTTTGCGTCCCGAGATGTTAG-3'
ARR5-R	5'- TACTATCATCAACAGCAAGAACATGA-3'
ARR15-F	5'- CCTAAGAGAATCCTACAAAACG-3'
ARR15-R	5'- CTTGGAAGATGGAGTGTCGTCA-3'
RGL1-F	5'- CGGATTCAAGAAAAGCCT-3'
RGL1-R	5'- ATTCTCGTCCTCTTGCTCC-3'

GH3.5-F	5'- TCGATCTGACGCTTGACCAAA-3'
GH3.5-R	5'- AAGATCTCCTCCAAGACTTGTCTTT-3'
IAA16-F	5'- GGTGGGAATCACGGAGGA-3'
IAA16-R	5'- GCTGGTGGTTTTACGACCTTCT-3'
AHP4-F	5'- CGGAAGGATGCTTGAGGACT-3'
AHP4-R	5'- TTGCCAACTGGAAATAATGT-3'
CORI3-F	5'- GACTTTGATAGCGTCCGAGC-3'
CORI3-R	5'- AAACCTCGTCAGAAACCACC-3'
JAZ10-F	5'- GCCGTCGTAGTTTCCGAGATA-3'
JAZ10-R	5'- CGAACGAGATTTAGCCGATGA-3'
LEA14-F	5'- AGGGAGATTGGAAAGGGGAAG-3'
LEA14-R	5'- ATGGTTAGACCGATTTGGAGC-3'
IAA18-F	5'- GAAATGACTCAACCACCTCCAAT-3'
IAA18-R	5'- ATCTTCTATGGATGATGGAAAGTCTC-3'
IAA7-F	5'- GGCTCCGTTGATCTCAAAAAC-3'
IAA7-R	5'- GCTGGCCTCCTCCGCAC-3'
Primers for *in situ* probes	
HAN-Sp6	5'- GATTTAGGTGACACTATAGAATGCTCGTGAAACCTGCAAACTGAA-3'
HAN-T7	5'- TGTAATACGACTCACTATAGGGACCGCGACTTGGCTTGTTAG-3'
HANL2-SP6	5'- GATTTAGGTGACACTATAGAATGCTCACAACACACACTTCTCTTTCTCC-3'
HANL2-T7	5'- TGTAATACGACTCACTATAGGGGAAGTGGTGTCGCAGTTGG-3'
GNC-SP6	5'- GATTTAGGTGACACTATAGAATGCTTTGGACTCTTTTTGCCGTCTAT-3'
GNC-T7	5'- TGTAATACGACTCACTATAGGGATGGTGATCCTCGTCGAAATTA-3'
GNL-SP6	5'- GATTTAGGTGACACTATAGAATGCTTTCGCTTCTCTTGGATCCTC-3'
GNL-T7	5'- TGTAATACGACTCACTATAGGGCGGAGCAAATCCTAATCACG-3'
Primers for *BiFC*	
HANL2c/5CACC	5’-CACCATGGGTTTCTCAATGTTCTTCT-3’
HANL2c/3stop	5’-TCACATCGTAAAATCGTGGACA-3’
GNCc/5CACC	5’-CACCATGGATTCAAATTTTCATTACT-3’
GNCc/3stop	5’-TCAACCGTGAACCATTCCATAC-3’
GNLc/5CACC	5’-CACCATGGGTTCCAATTTTCATTACA-3’
GNLc/3stop	5’-TCACCCGTGAACCATTCCGTGC-3’
HANL2c/5	5’-ATGGGTTTCTCAATGTTCTTCT-3’
HANL2c/3	5’-CATCGTAAAATCGTGGACA-3’
GNCc/5	5’-ATGGATTCAAATTTTCATTACT-3’
GNCc/3	5’-ACCGTGAACCATTCCATAC-3’
GNLc/5	5’-ATGGGTTCCAATTTTCATTACA-3’
GNLc/3	5’-CCCGTGAACCATTCCGTGC-3’
HANc/5CACC	5’-CACCATGATGCAGACTCCGTACACTAC-3’
HANc/3stop	5’-TCATCTGGTAAAGTCATGGACAAGA-3’
HANc/5	5’-ATGATGCAGACTCCGTACACTAC-3’
HANc/3	5’-TCTGGTAAAGTCATGGACAAGA-3’
Primers for ChIP-PCR	
HANp1-F	5′ - AACATCCGATGAAATTGGAA-3′
HANp1-R	5′ - AGATGACGGTTGTCCAAAAA-3′
HANp2-F	5′ - ATCGAGAGTCCATGTTTTCAATAAA-3′
HANp2-R	5′ - CTCAGCCTCATGTGGTTAATGAT-3′
HANp3-F	5′ - TTATTTTCTGTTAAATTTCCTCCA-3′
HANp3-R	5′ - CATTGCTAGCTTCCAAATATCA-3′

HANp4-F	5′ - ACTAGCAAACCCTTCGCTTT-3′
HANp4-R	5′ - TGTCACTGTGTGATTGTTTTGA-3′
HANp5-F	5′ - TGGCTGCCTAAAGAAACTTG-3′
HANp5-R	5′ - GAATGGAGAAGAAGGTCTCACA-3′
HANp6-F	5′ - CGTCCCCACATATTCTATTGATTT-3′
HANp6-R	5′ - TCTACTGGTTTGAAAACCCTAAGTG-3′
UBQ10-F	5’- TCCAGGACAAGGAGGTATTCCTCCG-3’
UBQ10-R	5’- CCACCAAAGTTTTACATGAAACGAA-3’
GNCp1-F	5’- TTGTCTATGAAGTTTCTATCGTCTAT-3’
GNCp1-R	5’- GCTTTTTATATGGGATCAGATTATG-3’
GNCp2-F	5’- TGGCTTATCACAACAAAGTCTATAAT-3’
GNCp2-R	5’- AAAATGAATATCTAACTAGCGTCTG-3’
GNCp3-F	5’- GACGGCAAAAAGAGTCCAAG-3’
GNCp3-R	5’- TGAGTCCATGGCACCCATA-3’
GNCp4-F	*5’*- CCGGACTTGTCCGAAAGTAG-3’
GNCp4-R	*5’*- GACGGCAAAAAGAGTCCAAG-3’